

WE CLAIM

1. A recombinant viral nucleic acid comprising:

(a) a first sequence which comprises a promoter and a non-native 5'-
untranslated sequence, wherein said non-native 5'-untranslated sequence comprises an
5 untranslated leader sequence and

(b) a second sequence which is downstream of and operatively linked to
said first sequence, wherein the amount of RNA or protein produced from said second
sequence is increased compared to the amount produced in the absence of said non-
native sequence; wherein said recombinant viral nucleic acid comprises less than an
10 infective viral genome.

2. The recombinant viral nucleic acid according to claim 1, wherein said
recombinant viral nucleic acid is derived from an RNA plant virus.

3. The recombinant viral nucleic acid according to claim 1, wherein said
recombinant viral nucleic acid native to a single-stranded, positive sense RNA plant
15 virus.

4. The recombinant viral nucleic acid according to claim 1, wherein said
recombinant viral nucleic acid is derived from an animal virus.

5. The recombinant viral nucleic acid according to claim 1, wherein said
recombinant viral nucleic acid is derived from a bacterial virus.

20 6. The recombinant viral nucleic acid according to claim 1 wherein said
non-native 5'-untranslated sequence is obtained by *in vitro* mutagenesis,
recombination, or a combination thereof.

7. The recombinant viral nucleic acid according to claim 1 wherein said
non-native 5'-untranslated sequence is constructed by moving the ATG start codon
25 downstream to a new site, thus creating an artificial leader sequence.

8. The recombinant viral nucleic acid according to claim 1 wherein said second sequence comprises a non-native coding sequence.

9. The recombinant viral nucleic acid according to claim 8 wherein said non-native coding sequence encodes a fusion protein between a coat protein and a
5 non-native protein or polypeptide.

10. The recombinant viral nucleic acid according to claim 8 wherein said non-native coding sequence encodes a product selected from the group consisting of enzymes, antibodies, hormones, pharmaceuticals, vaccines, pigments, and anti-microbial polypeptides.

10 11. A vector comprising the recombinant viral nucleic acid according to claim 1.

12. The vector according to claim 11 which is a plasmid.

13. An isolated host cell transformed with the recombinant viral nucleic acid according to claim 1.

15 14. The recombinant viral nucleic acid according to claim 1, wherein said first or second sequence further comprising a promoter sequence.

15. An expression vector comprising the recombinant viral nucleic acid according to claim 14.

16. The expression vector according to claim 15 which is a plasmid.

20 17. An isolated host cell transformed with the recombinant viral nucleic acid according to claim 14.

18. A recombinant viral nucleic acid comprising a non-native sequence inserted in any nucleotide position 5' to the initiation codon of said recombinant viral nucleic acid, wherein the amount of RNA or protein produced from said recombinant

viral nucleic acid is increased compared to the amount produced in the absence of said non-native sequence, wherein said recombinant viral nucleic acid comprises less than an infective viral genome, wherein said non-native sequence comprises an untranslated leader sequence.

5 19. The recombinant viral nucleic acid according to claim 18, wherein said recombinant viral nucleic acid is derived from an RNA plant virus.

 20. The recombinant viral nucleic acid according to claim 18, wherein said recombinant viral nucleic acid is derived from a single stranded, positive sense RNA plant virus.

10 21. The recombinant viral nucleic acid according to claim 18, wherein said recombinant viral nucleic acid is derived from an animal virus.

 22. The recombinant viral nucleic acid according to claim 18, wherein said recombinant viral nucleic acid is derived from a bacterial virus.

 23. The recombinant viral nucleic acid according to claim 18 wherein said
15 recombinant viral nucleic acid comprises a non-native coding sequence.

 24. The recombinant viral nucleic acid according to claim 23 wherein said non-native coding sequence encodes a fusion protein between a coat protein and a non-native protein or polypeptide.

 25. The recombinant viral nucleic acid according to claim 23 wherein said
20 non-native sequence encodes a product selected from the group consisting of enzymes, antibodies, hormones, pharmaceuticals, vaccines, pigments, and anti-microbial polypeptides.

 26. A vector comprising the recombinant viral nucleic acid according to claim 18.

27. The vector of claim 26 which is a plasmid.

28. An isolated host cell transformed with the recombinant viral nucleic acid according to claim 18.

29. The recombinant viral nucleic acid according to claim 18, wherein said
5 recombinant viral nucleic acid further comprises a promoter sequence.

30. An expression vector comprising claim 29.

31. The expression vector according to claim 30 which is a plasmid.

32. An isolated host cell transformed with the recombinant viral nucleic acid according to claim 29.

10 33. A method for enhancing the production of a protein in a host comprising the steps of expressing in said host a recombinant viral nucleic acid comprising:

(a) a first sequence which comprises a non-native 5'-untranslated sequence, and

15 (b) a second sequence which is downstream of and operatively linked to said first sequence, wherein said second sequence comprises a coding sequence encoding said protein.

34. The method according to claim 33 wherein said protein is a fusion protein with a coat protein.

20 35. A method for enhancing the production of a protein in a host comprising the steps of expressing in said host a recombinant viral nucleic acid comprising:

(a) a non-native sequence inserted in any nucleotide position 5' to the initiation codon of said recombinant viral nucleic acid and a coding sequence
25 encoding said protein.

36. The method according to claim 35 wherein said protein is a fusion protein with a coat protein.